

CHEMISTRY RESEARCH PROJECT

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"Lost in the Asgard Range"

The Scenario

"Let's get out of here, Harry!" you yell as you jump into the seat next to the pilot of Chemily, a two seated dual-engine aircraft. As you twist around in the seat to close the co-pilot hatch, you see the terrorists come rushing out of the hanger's side door. One of them stops and levels his semi-automatic assault weapon at your plane. The noise of his shots is covered by the plane's engine suddenly exploding to life. "Get outa here Harry; they're going to hit the plane!" He pushes the throttle forward and mutters to his plane, "Come on baby. We're gonna need all you got." To your relief, the gap between the Chemily and the airstrip's hangar quickly widens. The terrorists are still taking shots at you, but now you are out of range. Harry pulls the plane to 15,000 feet and levels off. "It's gonna be a long ride to Auckland," he says. "Man, you look like you need to be buried." Exhausted, you settle back in your seat. Since you haven't slept for days, you are really looking forward to a long, uneventful trip home in time to give your sweetie a valentine.

A sudden jolt awakens you from your rest. Harry is wrestling the yoke, trying to keep the plane level. "They shot my baby," he growls through his teeth. He taps one of the gauges with his finger. You lean over and see that the oil pressure is critically low. One of those shots must have hit the oil line. "We've lost the starboard engine," Harry shouts. You know that the oil systems in both engines are interconnected and that the engine on the left will stop soon. As you look outside your window, you can see smoke billowing from the other engine. Below, the barren, frozen, tundra of the McMurdo Dry Valley extends as far as the eye can see. "The other one's out!" Harry yells, "We're losing altitude fast! That should be Linnaeus Terrace just ahead. Our ASPA friends might beg to differ, but you might wanna start praying that I can make it there to land. I filed a flight plan with headquarters before we left, with any luck they'll send help. Brace yourself we're going down!" Suddenly you hear the deafening clamor of what sound like tearing metal. Just as you think the noise will never stop, you realize that you have crashed. With blood dripping down you face, you slowly unbuckle your seat belt and try to awaken Harry. Unfortunately, he is dead. Suddenly you smell fuel. Knowing that the plane will blow up at any minute, you quickly examine the cargo and debris scattered about the cabin of the plane. The list that follows describes those items that you are considering taking with you to survive the frozen desert of the Asgard Range.

1. *Sochi 2014* refrigerator magnet
2. Glass bottle labeled *"Mercury/Tin amalgam"*
3. Harry's grandfather's jewelers loupe
4. Book entitled Semaphore Flag Signals
5. Box of six Mountain House® Neapolitan ice cream bars
6. Mini sewing kit with two buttons, two needles, a safety pin, and 20" each of white, tan, blue, and black thread
7. Case of aluminum foil
8. 10 gal aquarium with four broken sides
9. Small amber colored bottle labeled *"Sodium"*
10. Backpack filled with a map of the Arctic Circle and surrounding regions, and maps of the constellations
11. One hundred milliliter bottle with torn label that partially reads *"...cobinamide cyanide phosphate..."*
12. Thirty square-meter sheet of black opaque polyvinyl chloride
13. Small box with a partially peeling label, *"Laudanum"*
14. Loaded pistol
15. UST JetScream Whistle
16. One meter of thin copper tubing
17. Five liter bottle labeled *"80% C₂H₅OH"*

18. Wooden crate containing 1 Qt bottles labeled *"Muriatic Acid"*
19. Fifty gram tube of zinc acetate ointment
20. Metal container labeled *"Promethium nitrate"*
21. Radio that works on alternating current
22. Ten square-meter sheet of red opaque polyvinyl chloride
23. Two liters of kerosene/oil mixture in a corked amber-colored bottle
24. Wooden box labeled *"2, 4, 6-trinitrotoluene"*
25. Hanvex Aluminum Penlight, without batteries
26. Small, crumpled envelope with handwritten label, *"Ricin"*
27. Large cardboard box containing white plastic bottles labeled *"Rooto 1030 1-lb. 100% Lye Household Drain Opener"*
28. Half empty jar of Kirkland Signature Peanut Butter Pretzels, 52 ounce
29. Small brown glass bottle labeled *"Acetylsalicylic Acid"*
30. Plane's flight log and manifest
31. Plastic bottle labeled *"Aspartame"*
32. Small bag labeled *"Une Douzaine de Citrons"*

The Mission

From your knowledge of chemistry, survival tactics, and research information, choose only 10 items from the above list which will maximize your chances for rescue.

After you have carried your supplies to a safe distance, the plane explodes, leaving useless debris strewn about the barren landscape. Emptying the pockets of your Eddie Bauer insulated parka you find, in addition to the other 10 items you had gathered only seconds earlier, a handkerchief, a passport, two quarters, three pennies, your lucky zinc penny, and a wallet containing a few credit cards, three \$50 bills, an address book, and a picture of your family. And now your attempt at survival begins.

The Journal

After your return to civilization, write an account of your survival. A hint on how to start: first, prioritize your needs, i.e., food, shelter, water, signal, etc. Second, identify each item and determine under which category it would be used. The rest is up to you! Your account should include these three major sections – each section separate and starting on a new page, and divided into smaller paragraphs:

- 1) The ten items you chose and a brief explanation as to why each would be chosen by an expert survivalist/chemist;
- 2) Items that would have been good to choose, but you were not able to because you could only take ten, and your reasons why;
- 3) Items you absolutely do not want to take with you and your reasons why.

IMPORTANT: Please be advised, your research on these items will take a long time and putting your journal together will also take a great deal of work. Make sure you budget your time so that you have not only ample time for research, but also plenty of time to write your journal account and put it in its proper format.

IMPORTANT: The following guidelines must be followed in presenting your journal account, or your paper may not be accepted. Read and follow carefully.

Journal Guidelines

1. Every item you discuss, no matter in which section of your paper, must be internally documented separately, highlighted, and listed in its own separate paragraph. If several items are being used to make one thing, they may be included together in the same paragraph; however, even then, each item must each be documented separately.
2. Even information that is common knowledge must be documented. If you write about all 32 items, you **MUST** have at least 32 separate internal references, one for each individual item, even if they all come from the same source. It will not be unusual for you to have more than one different internal reference for items. The internal documentation within the paper should follow immediately after the item is mentioned or when its use is described. (For the style of documentation to be used, see the end paragraph, Documenting Your Research Paper.)
3. You must have at least three different sources (that you may use multiple times), and only one of the three may be the Internet. However, once you have three different sources, you may use any one of them as many times as you need. For example, if you have two other sources besides the Internet, you may use the Internet as many times as you would like. You may not use Wikipedia or similar sites as a source. Such items will not be given any credit in your paper.
4. You must include at least three (3) hand drawn/traced illustrations to help explain your survival techniques. You may not use photocopies or computer printouts. At the bottom of each illustration, you must include internal documentation and the source must also be included in the Works Cited.
5. **At the end of your account, starting on a new page, include a bibliography or Works Cited. The entries in the Works Cited should be listed in the order that they occur in your paper, not in alphabetical order, using reverse indentation.** The beginning of each Works Cited entry should match exactly the internal documentation that you had for that item in your paper.
6. Make printed copies of the sources you use from the Internet and any books that aren't in our library. Copy the first page and the page(s) that you use, and highlight the portions that you use. Staple multiple pages.
7. Encyclopedia articles, dictionary entries, and Internet articles must be listed separately by the title of the article in both the internal documentation and the Works Cited.
8. Your journal account must be in manuscript form – typed and double spaced. You must include a title page, and every page following the title page must include your last name and page number in the top right hand corner. Check the Internet for samples of title pages and choose one that fits your own personal style.
9. Your journal must be put in the right pocket of an ordinary two-pocket folder. Do not put it in the brads. Put the copies of your sources in the left pocket of the folder in the order that they occur in your paper.
10. **The project is due at the beginning of the class period on the day assigned**. Because the project has been pre-assigned, **no late papers will be accepted**. If for any reason you are absent the day the project is due, it is still your responsibility to see to it that your paper is brought to school and turned in on time.

Notes

MANUSCRIPT FORM CHECKLIST (with points counted off):

- ☐ Title page (*minus 10 points*)
- ☐ Internal documentation (*paper will not be accepted without it*)
- ☐ Correct internal documentation (*minus 2 points for each occurrence, up to 20 points*)
- ☐ Three sections (each starting on a new page) with each item underlined and highlighted in YELLOW and in a separate paragraph within the section (*minus up to 20 points*)
- ☐ Sources copied (*minus 25 points if none, or minus 2 points each*)
- ☐ Illustrations (*minus 20 points*)
- ☐ Illustrations documented (*minus 10 points*)
- ☐ Works cited (*paper will not be accepted without it*)
- ☐ Works cited manuscript form (*minus up to 20 points*)
- ☐ Internal references included in paper also in Works Cited (*minus 2 points each up to 20 points*)
- ☐ Copied sources or Works Cited not in the correct order (*up to 20 points, and paper may not be accepted*)

Documenting Your Research Paper

Internal documentation in your chemistry research paper will be different than a standard English research paper. You will always use the year of publication instead of the page number. If your source is a book with an author or editor, use the last name of the author or editor and the copyright date of the work, not the page number – like this: (McManners 2007).

For books that have more than one author, list the first name mentioned, et al, and the date (Nesbitt, et al. 1984). If the book does not have an author, use the name of the book and the date – like this: (The History of the Arctic 1978).

For multi-volume or multi-entry works such as an encyclopedia or dictionary, site the entry and the copyright date of the work – like this: ("Permafrost" 2012). This is also how the articles will be listed in the Works Cited, first by the name of the article, and then the rest of the source (see below).

Works that do not have a copyright or publishing date should be followed by "n.d.", otherwise, always use the date, **never the page number**.

When you document an Internet site, use either the title of the article or the title of the web site, and the date (or n.d.) – like this: ("McMurdo Dry Valleys" n.d.). NEVER USE THE URL in your internal documentation.

Works Cited – Samples Only!!

(Not in alphabetical order, but in the order they occur in your paper!)

McManners, Hugh. The Complete Wilderness Training Manual". London: Dorling Kindersley, 2007.

"Permafrost." World Book Encyclopedia. 2012 ed.

Nesbitt, P., Pond, A. and Allen, W. A Pilot's Survival Manual. Reinhold: New York, 1978.

Craighead, F. and Craighead, J. How to Survive on Land and Sea. U.S. Navy: Annapolis, Md., 1984.

"McMurdo Dry Valleys." Internet. n. d. <http://www.mcmurdodryvalleys.aq/>